

5.3.7 Questions Starting with “H” (for Habitat Functions)

Functions Related to Habitat for All Classes of Wetlands

H 1.0 Does the Wetland Have the Potential to Provide Habitat?

H 1.1 Vegetation structure:

Rationale for indicator: More habitat niches are provided within a wetland as the number of types of vegetation structure increase. The increased structural complexity provided by different vegetation types optimizes potential breeding areas, escape, cover, and food production for the greatest number of species (Hruby et al. 1999). This increased species richness arising from the increased structural diversity also supports a greater number of terrestrial species in the overall wetland food web (Hruby et al 1999). The “Cowardin” vegetation classes are used as indicators of different types of structure in the plant community. In addition, the presence of vertical structure in forested communities is considered a characteristic that increases habitat complexity and niches.

For this question you will need to identify the “Cowardin” classes of vegetation in the wetland and whether the forested class has different strata present under the canopy. The classes are:

- Aquatic bed
- Emergent
- Scrub/shrub (areas where shrubs have >30% cover)
- Forested (areas where trees have >30% cover) AND
- Do forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover)

NOTE 1: Each vegetation class has to cover more than ¼ acre, or if the wetland is smaller than 2.5 acres, the threshold is 10% of the area of the wetland. “Cowardin” vegetation types are distinguished on the basis of the uppermost layer of vegetation (forest, shrub, etc.) that provides more than 30% surface cover within the area of its distribution (see p. 35).

NOTE 2: Aquatic bed plants do not always reach the surface and care must be taken to look beneath the water’s surface. Because waterfowl can heavily graze certain species of aquatic bed early in the growing season, it can be incorrectly concluded that aquatic bed is not present if the field visit is made during this time period.

Therefore, examine the substrate in open water areas for evidence of last year’s growth of aquatic bed species. If a wetland is being rated very late in the growing season, when either the standing water is gone or very limited in extent, examine mudflats and adjacent vegetated areas for the presence of dried aquatic bed species.

NOTE 3: If a vegetation type is distributed in several patches, the patches can be added together if the patches are large enough. Large enough means that 10 or fewer patches are needed to meet the size threshold (average patch size is greater than 10% of threshold in Note 1 above).

NOTE 4: Count how many strata (i.e. canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) are present in forested areas of the wetland. If more than 3 of the five strata are present record this on the field form.

H 1.2 Hydroperiods

Rationale: Many aquatic species have their life cycles keyed to different water regimes of permanent, seasonal, or saturated conditions. A number of different water regimes in a wetland will, therefore, support more species than a wetland with fewer water regimes. For example, some species are tolerant of permanent pools, while others can live in pools that are temporary (Wiggins et al. 1980).

For this question you will need to identify areas in the wetland with different water regimes. You are looking for areas with different patterns of flooding or saturation. For example, does part of the wetland have surface ponding only for a very short time (we call this occasionally flooded) or are there areas that have surface water all year (permanently flooded). The purpose is to identify the wettest water regime within different areas of the wetland. Thus, an area that is seasonally flooded, but only saturated during the field visit in the summer, would still be categorized as “seasonally flooded.” To count, the water regime has to cover more than 10% of the wetland or ¼ acre. The five water regimes that you need to identify are:

Permanently Flooded or Inundated — Surface water covers the land surface throughout the year, in most years.

NOTE: During high water in the winter and spring, it may be difficult to determine the area that would be permanently flooded during the summer dry period. One indicator of permanent water is an area of open water without vegetation inside the zone of seasonal inundation. Aerial photos taken during the summer may also show areas of permanent water.

Seasonally Flooded or Inundated — Surface water is present for extended periods (for more than 2 months during a year), especially early in the growing season, but is absent by the end of the season in most years. During the summer dry season it may be difficult to determine the area that is seasonally inundated. Use the indicators described in D1.4 (p. 41) to help you determine areas that are seasonally flooded or inundated.

Occasionally Flooded or Inundated — Surface water is present for brief periods of less than one month during the growing season, but the water table usually lies below the soil surface for most of the season. Plants that grow in both uplands and wetlands are characteristic of this water regime (facultative).

Saturated — The soil is saturated near the surface for long enough to create a wetland, but surface water is seldom present. The latter criterion separates saturated areas from inundated areas. In this case, there will be no signs of inundation on plant stems or surface depressions.

Permanently Flowing Stream — The wetland contains a river, stream, channel, or ditch with water flowing in it throughout the year within its boundaries or along one edge (in a riverine situation).

Intermittently Flowing Stream — The wetland contains a river, stream, channel, or ditch in which water flow is intermittent or seasonal within its boundaries or along one edge.

Figure 18 shows a hypothetical wetland with two water regimes – permanently flooded and seasonally flooded. Figure 36 shows a photograph of a slope wetland, also with two water regimes, - some areas are **occasionally flooded** from sheet flow during storms and the rest is **saturated** from subsurface flows. Figure 37 shows a depressional wetland with three water regimes.

NOTE: Wetlands that are classified as **Lake-fringe or Freshwater Tidal Fringe** are **scored 2 points for this question**. The water regimes in these two types of wetlands do not fit the descriptions above or are too difficult to determine in the field.



Areas that have no surface water present but are “saturated” during most of the year.

Small depressions that fill with surface water after storms. These areas are “occasionally flooded,” and cover at least 10% of the wetland

Figure 36: Slope wetland with two water regimes



Figure 37: A large depressional wetland with three water regimes: permanently flooded, seasonally flooded, occasionally flooded. The areas that are seasonally and occasionally flooded are found around the outer edge of the wetland.

H 1.3 Richness of Plant Species:

Rationale for indicator: The number of plant species present in a wetland reflects the potential number of niches available for invertebrates, birds, and mammals. The total number of animal species in a wetland is expected to increase as the number of plant species increases (Hruby, et al. 1999). For example, the number of invertebrate species is directly linked to the number of plant species (Knops et al. 1999). This indicator includes both native and non-native plant species (with the exceptions noted below) because both provide habitat for invertebrate and vertebrate species. The three non-native species excluded from the count tend to form large mono-cultures that exclude other species and reduce the structural richness of the habitat.

As you walk through the wetland, or do your delineation, keep a list of the patches of different plant species you find. You do not have to record individual plants, only species that form patches that cover at least 10 square feet. Different patches of the same species can be combined to meet the size threshold.

You should try to identify plants, but keying them out is not necessary. All you need to track is the total number, so you can identify species as Species 1, Species 2, etc. In order to capture the full range of plant species present during the year, record any species that are “dead” and recognizably different from other species present. There are 3

thresholds to keep in mind: 20 or more species, 5-19, and less than 5 species. If you count more than 19 you do not need to continue identifying plants.

For this question the following species are **NOT TO BE INCLUDED** in the total: Eurasian water-milfoil (*Myriophyllum spicatum*), reed canarygrass (*Phalaris arundinaceae*), Canadian thistle (*Cirsium arvense*)

H 1.4 Interspersion of Habitats:

Rationale for indicator: In general, interspersion among different physical structures (e.g. open water) and types of vegetation (e.g. aquatic bed, emergent vegetation, shrubs) increases the suitability for some wildlife guilds by increasing the number of ecological niches (Hruby et al. 1999). For example, a higher diversity of plant forms is likely to support a higher diversity of macro-invertebrates (Chapman 1966, Dvorak and Best 1982, Lodge 1985).

In question H.1.1 you determined how many different vegetation types are present in the wetland being rated. This question uses this information and also asks you to identify if there are any areas of open water in the wetland (open meaning without vegetation on or above the water surface during the spring, summer, or fall). You are asked to rate the “interspersion” between these structural characteristics of the wetland. The diagrams on the rating form show what is meant by ratings of High, Medium, Low, or None. Each area with a different shading represents a different habitat structure, either a vegetation type or open water.

To answer this question first consider if the interspersion falls into the two “default” ratings. If the wetland has only one vegetation category present (question H 1.1) and no open water, it will always be rated as NONE (see Figure 38, also Figs. 8, 15, 32, 33). If the wetland has four vegetation types (from question H 1.1), or three vegetation types and open water it will always be rated as HIGH. Figure 37 shows a depressional wetland with open water, emergents, aquatic bed, shrubs and forest classes. Thus, it automatically rates a HIGH. The only time you will have to make a decision is when the wetland has two or three types of structure that provide habitat.

Additional notes for determining the interspersion are:

- Lake-fringe wetlands will always have at least two categories of structure (open water and one type of vegetation).
- A wetland with a meandering, unvegetated, stream (seasonal or permanent) should be rated MODERATE if it has only one vegetation category, or HIGH if it has two or more.
- Several isolated patches of one structural category (e.g. patches of open water) should be considered the same as one “patch” with many lobes.



Figure 38: A depressional wetland with only one class of plants and no open water. The interspersions is rated as NONE.

H 1.5 Special Habitat Features:

Rationale for indicator: There are certain habitat features in a wetland that provide refuge and resources for many different species. The presence of these features increases the potential that the wetland will provide a wide range of habitats (Hruby et al. 1999). These special features include:

- 1) large downed woody debris in the wetland that provide major niches for decomposers (i.e. bacteria and fungi) and invertebrates,
- 2) snags that provide perches and cavities for birds and other animals,
- 3) undercut banks that provide protection for fish and amphibians,
- 4) stable, steep banks of fine material that might be used by aquatic mammals for denning,
- 5) thin-stemmed vegetation that provide structure on which amphibians can lay their eggs, and
- 6) vegetation dominated by non-invasive species that indicates the community is relatively undisturbed.

Record the presence of any the following special habitat features within the wetland on the rating form:

- Large woody debris within the wetland that is more than 4 inches in diameter at the base and more than 6 ft. long (Figure 39).
- Snags present in the wetland that are more than 4 inches in diameter at breast height (Figure 39).
- Steep banks of fine material for denning, or evidence of use of the wetland by

beaver or muskrat. Look for banks that are at least 33 ft long, 2 ft. high within or immediately adjacent to the wetland and determine if they have the following characteristics: steep bank of at least 30 degrees slope, with at least a 3 foot depth of fine soil such as sand, silt, or clay. This criterion can also be met if there is evidence of recent use of the area by beaver. Recently cut trees and shrubs, where the cuts are conical, are good evidence of beaver use (Figure 40).

- At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated.(structures for egg-laying by amphibians)
- Invasive plants cover less than 20% of the wetland area in each vertical stratum of plants present in the wetland (i.e. canopy, understory, herbaceous ground-cover). For example, a forested wetland with a 100% canopy of native species but with an understory of reed canary grass that covered 70% of the ground would not qualify for this characteristic. The species that are considered “invasive” for answering this question are as follows:

Cirsium arvense (Canadian thistle)

Rubus laciniatus (evergreen blackberry)

Rubus discolor (Himalayan blackberry)

Polygonum cuspidatum (Japanese knotweed)

Polygonum sachalinense (giant knotweed)

Polygonum cuspidatum x sachalinense (hybrid of Japanese and giant knotweeds)

Lysimachia vulgaris (garden loosestrife)

Lythrum salicaria (purple loosestrife)

Myriophyllum spicatum (European milfoil)

Phalaris arundinaceae (reed canarygrass)

Phragmites australis (common reed)

Tamarix spp.(either *Tamarix ramosissima* and/or *T. parviflora*, salt cedar.

There is some dispute regarding the correct taxonomy of the deciduous species of tamarisk that have escaped and become invasive in western North America.)

Make a check on the data sheet next to the description of each habitat feature. When you have checked for the presence of each, add the total that are present and record that as a score in the right-hand column.



Figure 39: Large woody debris and snags in wetland.



Figure 40: Evidence of beaver activity. Note the conical shape of the cut.

H 2.0 Does the Wetland Have the Opportunity to Provide Habitat?

H 2.1 Buffers

Rationale for indicator: The condition of the buffer affects the ability of the wetland to provide appropriate habitat for a wide range of wetland-dependent and wetland-associated species. Undisturbed buffers provide access (i.e. opportunity) to the wetland, thereby increasing the suitability of the wetland itself as habitat. For a review of how buffers affect the opportunity of a wetland to provide habitat see McMillan (2000). Relatively undisturbed buffers in excess of 330 feet are needed for a wetland to provide the best habitat (see reviews in Desbonnet et al. 1994, McMillan 2000).

Determine the condition of the buffer around the wetland using the descriptive key in the rating form. If the condition of the buffer does not match the description exactly, use the description that most closely matches. The descriptions focus on the width of the buffer that is relatively undisturbed, and the relative length of that buffer around the circumference of the wetland. The buffer areas adjacent to the wetland may be wetland, deep open water, or upland areas.

First determine if the buffer consists of any relatively undisturbed areas of forest, shrub-steppe, grassland (not currently grazed or tilled), or open water. The buffer is defined as any area (land or water) within 330 ft (100 m) of the edge of the wetland.

Any heavily used paved or gravel roads, residential areas, lawns, tilled fields, parking lots, or actively grazed pastures within a zone along the edge would disqualify the buffer from being “relatively undisturbed.” Bridges crossing streams or rivers within the buffer are considered as a “disturbance.” Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer, however, can be ignored as a “disturbance.” Open water that is not part of the wetland is considered part of the buffer. The open water can be considered undisturbed unless there is heavy boat traffic there.

NOTE: The criteria for categorizing the buffer are hierarchical. This means that you first determine if the buffer meets the first criterion. If it does, it is scored 5 points. If the wetland does not have a relatively undisturbed area of 330 ft (100 m) or more for more than 95% of its circumference, you determine if it matches the criterion for a buffer with a score of 4. If none of these criteria can be met, go to the criteria for the third category and assign 3 points if they are met, etc.



Figure 41: A wetland with no vegetated buffer. It scores a [0] on the buffer question.

H 2.2 Corridors and Connections:

Answer these questions in sequence. If you answer YES for any question starting with H2.2.1 record the appropriate points and go to question H 2.3. You only get one score for this question, even if more than one of the characteristics are present in the wetland.

Rationale for indicator: Corridors and undisturbed connections have been shown to be important dispersal and foraging areas for both terrestrial and aquatic species including amphibians, mammals, and birds (review in Adamus et al. 2001). Corridors provide areas for hibernation, foraging, and migration and dispersal for some amphibians (Nussbaum et al. 1983, Seaburn 1997). The presence of natural corridors increases a wetland's opportunity to provide habitat because there is a larger pool of species that can use the wetland (Hruby et al. 2000). In the absence of corridors, a wetland still has a better opportunity to provide habitat if there are other aquatic resources nearby. Reasons include: 1) a variety of upland habitat niches interspersed with different water sources results in greater habitat partitioning; 2) more opportunities for refuge, food and migration. This variable characterizes the connection of the wetland to other relatively undisturbed areas capable of providing habitat for a variety of species.

H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest, or native undisturbed grasslands that connects to estuaries, other wetlands, or relatively undisturbed uplands that are at least 250 acres in size? (Dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor)?

Start by looking for areas of undisturbed vegetation (vegetated corridor) connected to the wetland. The corridor may have a stream or channel in it. In riverine wetlands the stream or channel may be along one side. Next, determine if this area

of relatively undisturbed vegetation meets the criteria for width and percent cover of shrubs or trees. Finally, using a map or aerial photograph, determine if there is an area of undisturbed upland, wetlands, or estuaries, 250 acres in size that connects to the wetland by way of the corridor.

NOTE 1: In some cases, the large, undisturbed, area is immediately adjacent to the wetland and actually forms a part of the buffer. In this case answer YES to the first question.

NOTE 2: The lake adjacent to a lake-fringe wetland is not considered a corridor because it is not vegetated. If your wetland is a lake-fringe wetland, and does not have an upland connection to other natural areas, answer question H 2.2.2 as YES and add 2 points to the score rather than 4.

H 2.2.2 *Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands, or undisturbed uplands that are at least 25 acres in size? OR is the wetland a Lake-fringe wetland (if it does not have an undisturbed upland corridor as in the question above)?*

This question is similar to that above with the size thresholds for the corridor and upland reduced.

H 2.2.3 *Is the wetland: within 5 mi (8km) of a mouth of a river that discharges into salt or brackish water, OR within 3 mi of a large field or pasture (>40 acres), OR within 1 mi of a lake greater than 20 acres? (do not include man-made ditches)*

This question addresses only proximity to other habitat types and not the relative disturbance of the connections between them.

H 2.3 *Near or adjacent to other priority habitats listed by WDFW:*

Rationale for indicator: The Washington State Department of Fish and Wildlife has identified special habitats with unique or significant value to a diverse assemblage of species. The presence of these habitats increase a wetland's opportunity to provide important habitat resources because the unique species found in these priority habitats will use the wetland for foraging and water. The importance of a wetland as a habitat resource in the landscape increases if it is used by the unique, critical, or rare species associated with the priority habitats.

You are asked to determine if any habitats that meet the WDF definitions of priority habitats are within 330 ft of the wetland (100m). The descriptions of the habitats are from WDFW (as of April 1, 2003) and any updates are available on the department's web page -<http://www.wa.gov/wdfw/hab/phspage.htm>.

Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. Riparian habitat encompasses the area beginning at the ordinary high water mark and extends to that portion of the terrestrial landscape that is influenced by, or that directly influences, the aquatic ecosystem. Riparian habitat includes the entire extent of the floodplain and riparian areas of wetlands that are directly connected to stream courses.

Aspen Stands: Pure or mixed stands of aspen greater than 0.8 ha (2 acres).

Cliffs: Greater than 25 ft (7.6 m) high and occurring below 5000 (ft1524 m).

Old-growth west of Cascade crest:

- Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings;
- At least 8 trees/acre having a dbh (diameter at breast height) of 32 in. or more, or the 8 trees/acre are > 200 years of age;
- More than 4 snags/acre over 20 in. diameter and 15 ft tall;
- Numerous downed logs, including 4 logs/acre > 24 in. in diameter and > 50 ft long.
- High elevation stands > 2500ft may have lesser dbh [>30 in], fewer snags [> 1.5/acre], and fewer large downed logs [2 logs/acre that are > 24 in diameter and > 50 ft long].

Mature forests: Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; Oldest trees are 80 - 200 years old west of the Cascade crest.

Prairies and Steppe: Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community.

Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

Caves: A naturally occurring cavity, recess, void, or system of interconnected passages (including associated dendritic tubes, cracks, and fissures) which occurs under the earth in soils, rock, ice, or other geological formations, and is large enough to contain a human. Mine shafts may mimic caves, and those abandoned mine shafts with actual or suspected occurrences of priority species should be treated in a manner similar to caves. A mine is a man-made excavation in the earth usually used to extract minerals.

Oregon White Oak: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%; or where total canopy coverage of the stand is <25%, but oak accounts for at least 50% of the canopy coverage present. The latter is often referred to as oak savanna. In urban or urbanizing areas, single oaks or stands < 0.4 ha (1 ac) may also be considered a priority when found to be particularly valuable to fish and wildlife.

Urban Natural Open Space: A priority species (*as defined by WDFW*) resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development.

Estuary/Estuary-like: Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the

open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5% during the period of average annual low flow. Includes both estuaries and lagoons.

Marine/Estuarine Shorelines: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control).

Consolidated Substrate: Rocky outcroppings in the intertidal and subtidal marine/estuarine environment consisting of rocks greater than 25 cm (10 in) diameter, hardpan, and/or bedrock. **Unconsolidated Substrate:** Substrata in the intertidal and subtidal marine environment consisting of rocks less than 25 cm (10 in) diameter, gravel, shell, sand, and/or mud.

H 2.4 Position in Landscape:

Rationale for indicator: This indicator addresses one major aspect of a wetland's position in the landscape that affects its opportunity to provide habitat: the proximity of the wetland being rated to other wetlands (often called a wetland mosaic). The presence of adjacent wetlands increases the opportunity that the wetland can provide suitable habitat for a large number of species. Reasons include: 1) a variety of upland habitat niches interspersed with different water sources results in greater habitat partitioning; and 2) more opportunities for refuge, food and migration; and 3) more opportunity for re-colonization by wetland-dependent wildlife species in years of drought (Hruby et al. 2000).

For this question you will need to choose the description of the landscape around the wetland that best fits. If several descriptions apply, use the one that gives the most points.

- **There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore are OK, but connections should NOT be bisected by paved roads, fill, fields, pastures, or other development).**

Aerial photographs, NWI maps, or local wetland inventory maps can be useful in answering this question. If these data are not available, a visual survey of the surrounding countryside may be necessary. For this question you are looking only for vegetated wetlands. Other aquatic resources (e.g. streams, unvegetated lakes, etc.) are not to be counted.

“Relatively undisturbed” is used in the same way as in question H 2.1. It means that the connections between the wetlands are naturally vegetated (does not, however, have to be native species), and free of regular disturbances such as:

- Tilling and cropping
- Residential and urban development

- Moderate to heavy grazing
- Paved roads or frequently used gravel roads
- Mowing
- **There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed.**

In this case the wetland only needs to be within ½ mile of three other wetlands. The connections between the wetland being rated and the others are disturbed.

- **There is at least 1 wetland within ½ mile**

In this case the wetland only needs to be within ½ mile of only one wetland, and the connections can be either disturbed or undisturbed.

Calculating the Score and Category Based on Functions

Add the points for the habitat questions and record them on the first page of the rating form. Add all three scores together and determine the category for the wetland. Wetlands that are Category I based on functions need to score 70 points or more. Total scores between 51-69 are Category II; 30-50 are Category III, and less than 30 are Category IV.

5.4 CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

This rating system was designed to differentiate between wetlands based on their sensitivity to disturbance, their significance, their rarity, our ability to replace them, and the functions they provide. The first four criteria can be considered as values that are somewhat independent of the functions provided by a wetland. Questions SC 1 to SC 6 provide the information needed to identify and rate the wetlands with these special characteristics. These types of wetlands have an importance or value that may supercede their functions. **You should determine whether the wetland being rated meets any of the conditions described below as well as answering the questions about functions.**

SC 1.0 Estuarine wetlands

SC 1.1. Estuarine wetlands are vegetated, tidal fringe, wetlands where the concentration of salt in the water is greater than 0.5 parts per thousand (see p. 24). Estuarine wetlands of any size within National Wildlife Refuges, National Parks, National Estuary Reserves, Natural Area Preserves, State Parks, or Educational, Environmental or Scientific Reserves designated under WAC 332 30 151 are rated a Category I.

SC 1.2 Estuarine wetlands in which the salt marsh vegetation extends over more than 1 acre, and that meet at least two of the following three criteria are rated a Category I.

- The wetland is relatively undisturbed. This means it has no ditching, filling, cultivation, grazing, and the vegetation has less than 10% cover of non-native plant species. NOTE: If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of *Spartina* would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of *Spartina* in determining the size threshold of 1 acre.
- At least $\frac{3}{4}$ of the landward edge of the wetland has a 100 ft buffer of ungrazed pasture, shrub, forest, or relatively undisturbed freshwater wetland. A relatively undisturbed dike with vegetation that is not cut or grazed can count as an undisturbed buffer.
- The vegetated areas of the wetland have at least two of the following structural features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

SC 1.3 Any estuarine wetland that does not meet the criteria above for a Category I becomes a Category II wetland.

Note: Eel grass beds do not fall within the definition of vegetated wetlands used in the rating system. They are an important aquatic resource but they do not fall within the purview of this rating system.

SC 2.0 Natural Heritage wetlands

Is the wetland a Natural Heritage Wetland?

Wetlands that are Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. To answer this question you first need to determine if the Section, Township, and Range (S/T/R) within which the wetland is found contains a Natural Heritage site (Question SC 2.1 on the rating form). Appendix D lists this information for Washington as of March 2003. If the site does not fall within the S/T/R's listed, it is not a heritage site. (*This question is used to screen out most sites before you need to contact WNHP/DNR*). More up-to-date information may be available on the Natural Heritage internet site at (<http://www.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf>).

If, however, the wetland being rated falls within one of the Section/Township/Ranges listed, you will need to contact the Natural Heritage Program directly to find out if the wetland is a heritage site (Questions SC 2.2 and SC 2.3). Procedures for requesting this information are available on their web site <http://www.dnr.wa.gov/nhp/refdesk/index.html> (as of July 2004). Another option is to contact the Natural Heritage Program by calling 360-902-1667. You should ask whether the wetland has been identified as a heritage wetland. The Natural Heritage Program will provide information on whether the site contains a Natural Heritage plant community, sensitive species or T/E plant species. If it does it is a Category I wetland.

SC 3.0 Bogs

Is the wetland a bog? If the wetland meets the criteria for bogs described below, it is a Category I or II wetland. Bogs cannot be replicated through compensatory mitigation and are very sensitive to disturbance.

The terms associated with bogs are complex and often confusing (e.g. bogs, fens, mires, peat bogs, Sphagnum bogs, heath). Bogs occupy one end of a gradient of wetlands dominated by organic soils, low nutrients, and low pH (between 3.5 and 5.0). Bogs are generally acidic, and have low levels of nutrients available for plants due to receiving water primarily from precipitation. Plants growing in these sensitive wetlands are specifically adapted to such conditions, and are usually not found, or uncommonly found, elsewhere. Relatively minor changes in the water regime or nutrient levels in bogs may cause major changes in the plant community. Bogs, and their associated acidic peat environment, provide a habitat for unique species of plants and animals. The ground is usually very spongy and covered with mosses (often of the genus *Sphagnum*). Some bogs will actually float on top of a lake or pond.

Forested bogs are more difficult to identify. Bogs may contain highly stunted individual trees of sitka spruce, western red cedar, western hemlock, lodgepole pine, western white pine, Engelmann's spruce, sub-alpine fir, aspen, or crab apple. However, some bogs contain mature, full-size, trees especially on the Long Beach Peninsula. These wetlands contain mature, full-sized trees of sitka spruce, western red cedar, western hemlock, lodgepole pine, western white pine, Engelmann's spruce, or aspen.

The trees grow very slowly and may take many centuries to reach sizes common in much younger forests. The characteristics that typically identify these forests as bogs are peat soils and, frequently, the presence of shrub or herbaceous bog species such as Sphagnum moss. Sphagnum or other bog species may only cover a small portion of the ground, especially if there are pools of standing water in the forest or if there is substantial litter.

Identifying bogs can be challenging, particularly in a forested setting. It is necessary to confirm the presence of organic soils by digging soil pits, and it further requires the identification of particular plant species. It may also be difficult to determine the boundaries of a bog.

Key for Identifying Bogs in the Rating System

1. Does the wetland have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)

Yes - go to Q. 3

No - go to Q. 2

The following description of organic soils is from the Natural Resources Conservation Service (formerly the Soil Conservation Service). Soils with an organic carbon content of 18% or more (excluding live roots) if the mineral fraction contains more than 60% clay; 2) soils with an organic carbon content of 12% if the mineral fraction contains no clay; or 3) soils with an organic carbon content between 12-18% based on the percentage of clay present (multiply the actual percentage of clay by 0.1 and add to 12%). It is not usually necessary, however, to do a chemical analysis of the soil to determine if a soil is organic. Organic soils are easy to recognize as black- colored mucks or as black or dark brown peats. Mucks feel greasy and stain fingers when rubbed between the fingers. Peats have plant fragments visible throughout the soil and feel fibrous. Many organic soils, both peats and mucks, may smell of hydrogen sulfide (rotten eggs).

2. Does the wetland have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

Yes - go to Q. 3

No - **Is not** a bog for purpose of rating

3. Does the wetland have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)?

Yes – **Is a bog** for purpose of rating

No - go to Q. 4

NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species are present in Table 3, the wetland is a bog.

4. Is the wetland forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the

bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)?

Yes – **Is a bog** for purpose of rating No - **Is not** a bog for purpose of rating

NOTE: Total cover is estimated by assessing the area of wetland covered by the shadow of plants if the sun were directly overhead. You are trying to determine whether 30% of the total "footprint" of plants on the site consists of plant species listed in Table 3. If the wetland can be identified as a relatively undisturbed bog, the category rating is based on its size. Bogs larger than ½ acre are Category I wetlands, and bogs between ¼ and ½ acre are Category II wetlands. If the bog is less than ¼ acre it should be rated based on its functions only.

Table 3

Characteristic bog species in Washington State

<i>Andromeda polifolia</i>	Bog rosemary
<i>Betula glandulosa</i>	Bog birch
<i>Carex aquatilis</i>	
<i>Carex atherodes</i>	Awned sedge
<i>Carex brunescens</i>	Brownish sedge
<i>Carex buxbaumii</i>	Brown bog sedge
<i>Carex canescens</i>	Hoary sedge
<i>Carex chordorhiza</i>	Creeping sedge
<i>Carex comosa</i>	Bearded sedge
<i>Carex echinata var phyllomania</i>	
<i>Carex lasiocarpa</i>	Woolly-fruit sedge
<i>Carex leptalea</i>	Bristly-stalk sedge
<i>Carex limosa</i>	Mud sedge
<i>Carex livida</i>	Livid sedge
<i>Carex paupercula</i>	Poor sedge
<i>Carex rostrata</i>	Beaked sedge
<i>Carex saxatilis</i>	Russet sedge
<i>Carex sitchensis</i>	Sitka sedge
<i>Carex interior</i>	Inland sedge
<i>Carex pauciflora</i>	Few-flower sedge
<i>Carex utriculata</i>	Bladder sedge
<i>Cladina rangifera</i>	Reindeer lichen
<i>Drosera rotundifolia</i>	Sundew
<i>Eleocharis pauciflora</i>	Few-flower spike rush
<i>Empetrum nigrum</i>	Black crowberry
<i>Eriophorum chamissonis</i>	Cottongrass
<i>Eriophorum polystachion</i>	Coldswamp cottongrass
<i>Fauria crista-galli</i>	Deer-cabbage
<i>Gentiana douglasiana</i>	Swamp gentian
<i>Juncus supiniformis</i>	Hairy leaf rush
<i>Kalmia occidentalis</i>	Bog laurel
<i>Ledum groenlandicum</i>	Labrador tea

<i>Menyanthes trifoliata</i>	Bog bean
<i>Myrica gale</i>	Sweet gale
<i>Pedicularis groenlandica</i>	Elephant's-head lousewort
<i>Platanthera dilatata</i>	Leafy white orchid
<i>Potentilla palustris</i>	Marsh cinquefoil
<i>Rhynchospora alba</i>	White beakrush
<i>Salix commutata</i>	Under-green willow
<i>Salix eastwoodiae</i>	Mountain willow
<i>Salix farriar</i>	Farr willow
<i>Salix myrtillifolia</i>	Blue-berry willow
<i>Salix planifolia</i>	Diamond leaf willow
<i>Sanguisorba officinalis</i>	Great burnet
<i>Sphagnum spp.</i>	Sphagnum mosses
<i>Spiranthes romanzoffiana</i>	Hooded ladies'-tresses
<i>Tofieldia glutinosa</i>	Sticky false-asphodel
<i>Vaccinium oxycoccus</i>	Bog cranberry

NOTE: Latin names and spelling are based on the U.S. Fish and Wildlife Service, "National List of Plant Species that Occur in Wetlands: Washington". Biological Report May 1988.NERC-88/18.47.

If in doubt, it is important to consult someone with expertise in identifying bogs. The intent of the criteria is to include those bogs that have relatively undisturbed native plant communities.

SC 4.0 Forested Wetlands - *Does the wetland have at least 1 acre of forest that meet the criteria for the Department of Fish and Wildlife's old-growth or mature forests?*

To answer this question you will need to map out the areas of the wetland that are forested (see question H 1.1 on p. 72). You will then have to determine if the trees in at least one acre of the wetland are old enough, or large enough, to meet the criteria for priority habitats listed below.

- **Old-growth forests:** (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age **or** have a diameter at breast height (dbh) of 32 inches (81 cm) or more.

NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is an "OR" so old-growth forests do not necessarily have to have trees of this diameter. Unpublished data collected in wetlands suggest that 200 year-old trees may have different diameters.

- **Mature forests:** (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old **or** have average diameters (dbh) exceeding 21 inches (53cm); canopy cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.

NOTE: The criterion for dbh is based on measurements for upland forests.

Eighty to 200 year-old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is an “OR” so mature forests do not necessarily have to have trees of this diameter.

If you have one acre of old-growth or mature forest the wetland is Category I. If only part of the wetland is forested, and the category based on functions is II or III, the wetland may be assigned a dual rating as described in Section 4.3.

SC 5.0 Wetlands in Coastal Lagoons

Coastal lagoons are shallow bodies of water, like a pond, partly or completely separated from the sea by a barrier beach. They may, or may not, be connected to the sea by an inlet, but they all receive periodic influxes of salt water. This can be either through storm surges overtopping the barrier beach, or by flow through the porous sediments of the beach. Coastal lagoons may have freshwater flowing into one side that dilutes the salinity below the 0.5 ppt. The seaward edges of the lagoons, however, always contain some salt water.

Does the wetland meet all of the following criteria for a wetland in a coastal lagoon?

To be rated as a wetland in a coastal lagoon, a wetland and its associated lagoon has to meet all of the following criteria.

- The vegetated wetland lies in a depression with open water for at least part of the year that is adjacent to marine waters. This depression is wholly or partially separated from those marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks along part of its circumference (see Figures 42, 43). The banks can be vegetated or bare.
- The unvegetated areas of the lagoon contain water, in at least some parts of the lagoon, that is saline or brackish (> 0.5 ppt) during most of the year (*needs to be measured near the bottom*).
- The lagoon retains some of its surface water at low tide during spring tides.

The categorization of wetlands in coastal lagoons is based on the size and level of disturbance in the wetland and its buffers. If a wetland in a coastal lagoon meets all three of the following criteria it is Category I. If the criteria are not met it is a Category II wetland.

- The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 78).
- At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
- The wetland is larger than 1/10 acre (4350 square feet)



Figure 42: A coastal lagoon on Hood Canal with associated wetlands that is separated from the ocean by a vegetated bar of gravel and sand. The lagoon has no surface-water connection to the ocean. Salt water, however, can enter the lagoon through the bar or over the top during storms.



Figure 43: A coastal lagoon with a surface-water connection to Puget Sound. In this case there is a salt marsh separating the lagoon from the ocean as well as a sand bar.

SC 6.0 Interdunal Wetlands

Is the wetland west of the 1889 line known as the Western Boundary of Upland Ownership or WBUO?

Interdunal wetlands form in the “deflation plains” and “swales” that are geomorphic features in areas of coastal dunes. These dune forms are the result of the interaction between sand, wind, water and plants. The dune system immediately behind the ocean beach (the primary dune system) is very dynamic and can change from storm to storm (Wiedemann 1984). These wetlands provide critical habitat in this ecosystem (Wiedemann 1984) but many of the more recently formed wetlands cannot be characterized using the questions on the field form (see p. 9).

Wetlands located west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO) along the coast are considered interdunal wetlands because they have formed only in the last century. These wetlands all have formed as a result of accretions of the beach westward since 1889.

In practical terms that means the following geographic areas:

- Long Beach Peninsula- lands west of SR 103
- Grayland-Westport- lands west of SR 105
- Ocean Shores-Copalis- lands west of SR 115 and SR 109

Interdunal wetlands that are 1 acre or larger are a Category II based on their type. Those between 0.1 and 1 acre are Category III. The rating form for Depressional wetlands should still be filled out, however, to determine if the wetlands have enough habitat structure to be categorized higher.

NOTE: Small interdunal wetlands often form a mosaic behind the primary dunes (see Figures 44, 45). If the interdunal wetlands meet the criteria for wetlands in a mosaic (see p. 15) and described below, then the category should be based on the overall size of the mosaic not an individual patch.

- Each patch of wetland is less than 1 acre (0.4 hectares), and
- Each patch is less than 100 ft (30 m) apart, on the average, and
- The areas delineated as vegetated wetland are more than 50% of the total area of both the wetlands and dunes.



Figure 44: Intertidal wetlands along the Pacific Coast.

Intertidal wetlands that are larger than 1 acre. Individual wetland areas may be smaller than 1 acre, but they form a mosaic that is larger than 1 acre.



Figure 45: Intertidal wetlands along the Pacific Coast.

Mosaic of wetlands less than 0.1 acres in size

Mosaic of wetlands less than 1 acre in size

5.5 RATING THE WETLAND

Each wetland can have several ratings: one resulting from its score for the functions and one or more resulting from special characteristics it may have. The first page of the rating form contains a box for recording each rating. This box should be filled out after completing the form. Pick the “highest” category (i.e. the lowest number) when assigning an overall category for the wetland being rated.

The first page of the rating form also contains a table in which you can summarize the hydrogeomorphic class of the wetland and whether it falls into one of the “special” types of wetlands.